

Indian National Biology Olympiad (INBO) -2023

Homi Bhabha Centre for Science Education (HBCSE-TIFR)

Answer Booklet

Time: 2 hrs

ROLL NO. – –

Max. Marks: 300

- Please write your roll number on the top of **every page of this answer booklet** in the space provided.
- Before starting, please ensure that you have received a copy of the answer booklet containing a total of 12 numbered sheets.
- **This answer booklet must be returned to the invigilator**

(Do not write anything below this line)

	X	Y	Not attempted	
Section A				3X - Y =
Section B				3X =
Total score/ =				

HBCSE

SECTION A

Q. No.	a	b	c	d	Q. No.	a	b	c	d	Q. No.	a	b	c	d
1.			✓		12.		✓			23.		✓		
2.	✓				13.			✓		24.	✓			
3.				✓	14.		✓			25.				✓
4.				✓	15.	✓		✓		26.	✓			
5.			✓		16.	✓				27.		✓		
6.			✓		17.	✓				28.		✓		
7.			✓		18.		✓			29.		✓		
8.			✓		19.				✓	30.	✓			
9.		✓			20.			✓		31.		✓		
10.				✓	21.			✓		32.			✓	
11.	✓				22.			✓						

	X	Y	Not attempted	
Section A				3X - Y =

SECTION B

CELL BIOLOGY (17 Points)

33. (4 points)

Answer: ___~4___ molecule/s ___2___ cell/s

Calculations:

34. (2.5 point)

	a.	b.	c.	d.	e.
True			✓		✓
False	✓	✓		✓	

35. (2 points)

	a.	b.	c.	d.
True	✓		✓	
False		✓		✓

36. (4.5 points)

	Property of the molecule	Molecule	Ability to pass through phospholipid bilayer
1.	Large uncharged polar molecule	Glucose	Impermeable
2.	Charged polar molecule	Glycine	Impermeable
3.	Ions	Calcium, bicarbonate	Impermeable
4.	Uncharged non-polar molecule	Carbon dioxide	Permeable

37. (4 point)

	a.	b.	c.	d.
True	✓	✓	✓	
False				✓

PLANT SCIENCES (10 points)

38. (2 points)

a.	b.	c.	d.
✓			

39. (2 points)

	a.	b.	c.	d.
Correct				✓
Incorrect	✓	✓	✓	

40. (6 points)

A: _____ III _____

B: _____ V _____

C: _____ VI _____

D: _____ II _____

E: _____ I _____

F: _____ IV _____

ANIMAL SCIENCES (10.5 points)

41. (2 points)

	a.	b.	c.	d.
Correct	✓			✓
Incorrect		✓	✓	

42. (6 points)

Case	Primary process underway	Compensatory mechanism	Symptoms
I	b	g	II
II	c	a	III

43. (2.5 points)

(A) _____ II

(B) _____ I

(C) _____ III

(D) _____ I or III

(E) _____II

GENETICS & EVOLUTION (12.5 points)**44.** (2.5 points)

Medium	i.	ii.	iii.	iv.	v.
Expressed			✓		
Not expressed	✓	✓		✓	✓

45. (3 points)

Answer: ____0____%

Calculations /Explanation:

46. (3 points)

Answer: ____1370 - 1388____plants

Calculations:

47. (2 points)

	a.	b.	c.	d.
True			✓	✓
False	✓	✓		

48. (2 points)

a.	b.	c.	d.
		✓	

ECOLOGY (10 points)

49. (2 points)

a.	b.	c.	d.
	✓		

50. (2 points)

	a.	b.	c.	d.
Correct	✓			✓
Incorrect		✓	✓	

51. (2 points)

	a.	b.	c.	d.
Correct		✓	✓	✓
Incorrect	✓			

52. (2 points)

	a.	b.	c.	d.
True		✓	✓	✓
False	✓			

53. (2 points)

	a.	b.	c.	d.
True			✓	✓
False	✓	✓		

ETHOLOGY (2 points)

54. (2 points)

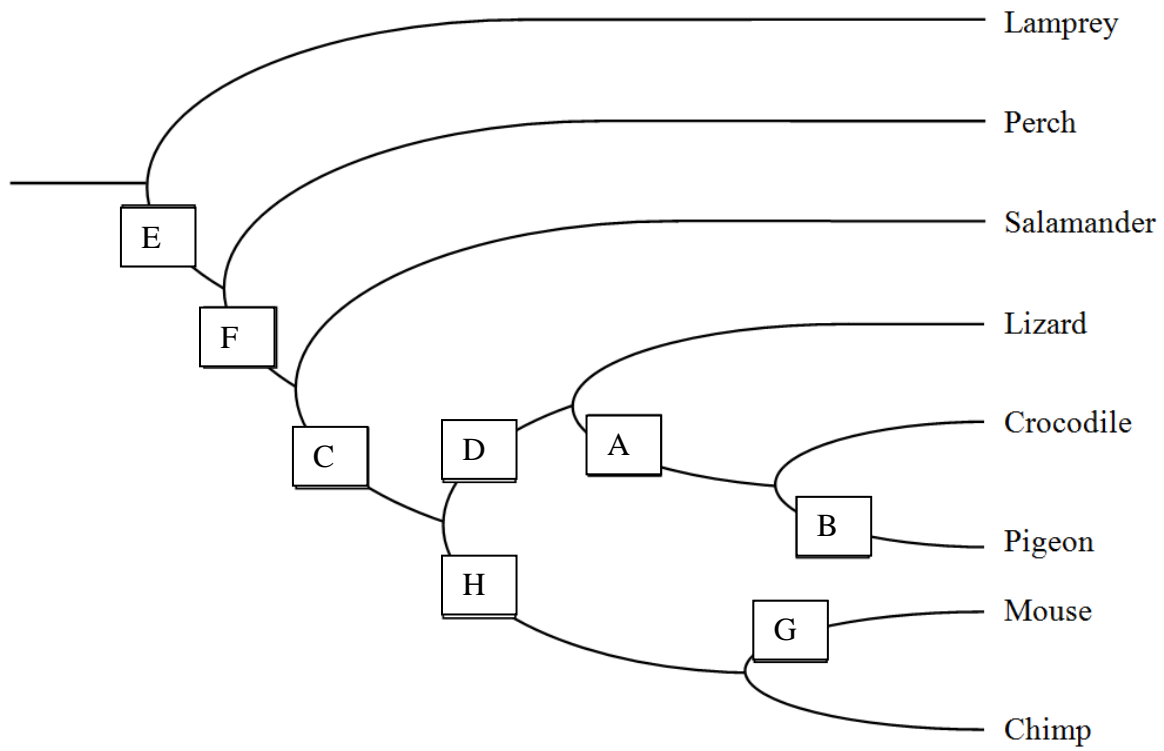
	a.	b.	c.	d.
True / सही				✓
False / गलत	✓	✓	✓	

BIOSYSTEMATICS (6 points)

55. (2 points)

	a.	b.	c.	d.
True	✓	✓		
False			✓	✓

56. (4 points)



*****END OF SECTION B *****

INBO – 2023

ROLL NO. – –

ROUGH WORK

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INBO – 2023

ROLL NO. – –

ROUGH WORK

HBCSE